Remarks:

Reconsideration of the application, as amended herein, is respectfully requested.

Applicants gratefully acknowledge the courtesy shown by Examiner Tung Vo to Applicants' representative in a telephonic interview in which it was confirmed that the present Office Action was **non**-final.

Claims 24 - 44 and 47 - 48 are presently pending in the application. Claims 24, 33 - 38 and 47 have been amended. Claims 1 - 23 and 45 - 46 were previously canceled. New claim 48 has been added.

In item 3 of the above-identified Office Action, claims 24 - 32, 37, 39 and 41 - 44 were rejected under 35 U.S.C. § 101, as allegedly not being falling within one of the four statutory categories of invention. In order to even more closely conform to the guidelines set out by the USPTO in response to In re Bilski, Applicants have amended claim 24 to recite, among other limitations:

> A method for coding transform coefficients, **the method being performed by a computer programmed to perform**,
>
> **for blocks of (video) pictures containing transform coefficients being unequal to zero, a coding** of transform coefficients takes place in such a way that, for each block, [emphasis added by Applicants]

As such, Applicants' claim 24 recites a method tied to a specific machine, i.e., a special purpose computer programmed to perform a particularly defined coding, and thus satisfies the "machine-or-transformation" requirements set out by the Court.

Similarly, Applicants' independent claim 37 has been amended to recite, among other limitations:

> **decoding the coded values of transform coefficients being unequal to zero, <u>using a computer programmed to perform the decoding</u>**, by, in the reverse scan order, binary arithmetically decoding bins of a binarization of a magnitude of the transform coefficients being unequal to zero in a context-dependent way using contexts depending on how many transform coefficients having a magnitude of 1 have already been decoded in the reverse scan order up to a respective currently decoded transform coefficient, and how many transform coefficients having a magnitude of greater than 1 have already been decoded in the reverse scan order up to the respective currently decoded transform coefficient, respectively, with decoding all bins of the binarization of the respective currently to be coded transform coefficient being unequal to zero before proceeding with decoding the bins of the binarization of a - in the reverse scan order - succeeding transform coefficient being unequal to zero. [emphasis added by Applicants]

Thus, Applicants' claim 37 additionally satisfies the "machine-or-transformation" test set forth by the Court.

The amendments to claims 24 and 37 are supported by the specification of the instant application, for example, on page 7 of the instant application, lines 23 - 30, which state:

> In accordance with a third aspect, **the present invention provides a computer program enabling a computer, after having been loaded into the memory of the computer, to perform a method for coding transform coefficients** in picture and/or video coders and decoders, wherein for blocks of (video) pictures containing significant transform coefficients, the coding of transform coefficients takes place in such a way that, for each block, [emphasis added by Applicants]

In view of the foregoing, Applicants' believe that claims 24 - 32, 37, 39 and 41 - 44 are statutory subject matter under 35 U.S.C. § 101.

In item 4 of the Office Action, claims 34 - 36 were rejected under 35 U.S.C. § 101 because the medium was allegedly not a memory of a computer or a statutory medium. Applicants have amended claims 34 to recite, among other limitations:

> **A computer program, stored on a computer readable medium and executable by a computer to perform a method for coding** transform coefficients, wherein [emphasis added by Applicants]

Similarly, Applicants have amended claim 35 to recite, among other limitations:

> **A computer-readable medium having a computer program stored thereon,** said computer program executable by a computer to perform a method for coding transform coefficients, wherein [emphasis added by Applicants]

Additionally, Applicants' claim 36 has been amended to recite, among other limitations:

> **A computer program stored in a computer memory and executable by a computer to perform a method** for coding transform coefficients, wherein [emphasis added by Applicants]

As such, each of Applicants' claims 34 or 36 recite, among other limitations, a computer program stored on a computer readable medium (claims 34 and 35) or in a computer memory (claim 36) that is executable by a computer to perform a particularly recited method for coding transform coefficients. M.P.E.P. § 2106.1 states, in part:

> Both types of "descriptive material" are nonstatutory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. **When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized.** Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)(discussing patentable weight of data structure limitations in the context of a statutory claim to **a data structure stored on a computer readable medium** that increases computer efficiency) and >In re< *Warmerdam*, 33 F.3d *>1354,< 1360-61, 31 USPQ2d *>1754,< 1759 (**claim to computer having a specific data structure stored in memory held statutory** product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory). [emphasis added by Applicants]

Thus, each of Applicants' claims 34 - 36 recite functional data structures recorded on a memory or computer readable media that permits the function of the computer program to be realized. As such, as set forth in M.P.E.P. § 2106.01,

Applicants' claims 34 - 36 are statutory subject matter under 35 U.S.C. § 101.

For the foregoing reasons, among others, Applicants' claims are believed to be directed to statutory subject matter under 35 U.S.C. § 101.

In item 6 of the above-identified Office Action, claims 24 - 44 and 47 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over U. S. Patent No. 7,190,840 to Said ("**SAID**") in view of U. S. Patent No. 6,577,251 to Yip ("**YIP**"). In item 7 of the above-identified Office Action, claims 24 - 44 and 47 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over **YIP** in view of U. S. Patent No. 6,819,803 to Mitchell et al ("**MITCHELL**").

Applicants respectfully traverse the above rejections.

More particularly, claim 24 recites, among other limitations:

> **a significance map is coded, the significance map specifying the positions of transform coefficients being unequal to zero** in the block in a scan order in a context-dependent way using contexts depending on the corresponding scan position of the transform coefficient considered, and subsequently, [emphasis added by Applicants]

Applicants' independent claims 33 - 36 recite similar limitations, among others. Additionally, Applicants' claim 37 recites, among other limitations:

> **decoding the significance mapping** in a context-dependent way in the scan order using contexts depending on the corresponding scan position of the transform coefficient considered; [emphasis added by Applicants]

Applicants' independent claims 38, 47 and 48 recite similar limitations, among others.

As such, among other limitations, Applicants' claims specifically recite either the coding of a significance map (claims 24 and 33 - 36) or the decoding of a significance mapping (claims 37, 38, 47 and 48) in a particularly recited context-dependent way.

However, contrary to the assertions of the Office Action, the cited prior art references do not teach or suggest the above limitations of Applicants' claims, among other limitations.

More particularly, with regard to Applicants' claims pages 3 - 4 of the Office Action alleged, in part, that the **SAID** reference disclosed:

> a significance map (**fig. 2, there is a significance map, 210 of fig. 2, significance maps, 212, 214, and 216 of fig. 2, are coded by compression, 112, and 114**

> **of fig. 1**) is coded, the significance map specifying the positions of transform coefficients being unequal to zero in the block scan order (e.**g. 212, 214, and 216 of fig. 1, col. 3, lines 15-49, 314 of fig. 3, note ALL COEFFICIENTS IN, ALL SCANS = 0, NO)** in a context-dependent way using contexts depending on the corresponding scan position of the transform coefficient considered (**fig. 3, the context-based coding assigns different codebooks to different distributions, scan position, 214, 212, 216 of fig. 2**), and subsequently (**326 of fig. 3).** [emphasis added by Applicants]

Applicants respectfully disagree.

Fig. 2 of **SAID** does **not** teach or suggest coding or decoding a significance map, as required by Applicants' claims. More particularly, Fig. 2 of **SAID** merely shows **three scan patterns 212, 214 and 216.** Item 210 of **SAID** (alleged in the Office Action to be a significance map) merely generally indicates a **transform coefficient block**. See, for example, col. 2 of **SAID**, lines 16 – 26 (i.e., "Additional reference is now made to Fig. 2, which shows an 8x8 block 210 of DCT coefficients. ..."). As such, in contrast to the allegations of the Office Action, **none** of elements 210, 212, 214, or 216 of Fig. 2 of **SAID** disclose a significance map, as required by Applicants' claims.

The Office Action also alleged that the elements 212, 214 and 216 of Fig. 2 of **SAID** were "coded by compression". **SAID**, in fact, discloses that "each scan 212, 214 and 216 covers 21

coefficients" (see, for example, col. 2 of **SAID**, lines 39 - 40) and that "the coefficients covered by the first scan 212 are coded and added to the bit stream, then the coefficients covered by the second scan 214 are coded and added to the bit stream, and then the coefficients covered by the third scan 216 are coded and added to the bit stream" (see, for example, col. 2 of **SAID**, lines 44-48).

However, Applicants' presently pending independent claims make clear that the particularly claimed **significance map** is **different from a coding of the actual transform coefficients**. In particular, the independent claims of the present application require, among other things, decoding or coding of **a significance map "specifying the positions of transform coefficients being unequal to zero in the block scan order"**. Thus, the indication made in the Office Action that the individual scans 212, 214, 216 of **SAID** are coded by compression is superfluous as far as the coding of a significance map is concerned. Applicants' claims require the coding/decoding of a **significance map specifying the positions of transform coefficients being unequal to zero**, which is not taught or suggested in **SAID**.

The same deficiencies apply to the application of elements 112 and 114 of **SAID**, pointed to in the Office Action. More

particularly elements 112 and 114 of **SAID** merely denote method steps related to the coding of the transform coefficients under the method of **SAID**. However, as discussed above, a significance map, as defined in Applicants' claims, is **not** merely a coding of the actual transform coefficients, as represented by elements 112 and 114 of **SAID**. Rather, as recited right in Applicants' claims, **Applicants' particularly claimed significance map specifies the positions of the transform coefficients being unequal to zero in the block in a scan order**. This is simply not taught or suggested in **SAID**.

The Office Action also points to col. 3 of **SAID**, lines 15-49, as allegedly disclosing a significance map **specifying the positions of the transform coefficients being unequal to zero in the block in a scan order**. Applicants respectfully disagree.

Rather, in contrast to Applicants' claimed invention, col. 3 of **SAID**, lines 15-49 relates to the afore-mentioned coding of transform coefficients rather than the **positions** thereof. Further, as becomes clear from the paragraph immediately preceding the portion cited in the Office Action, in **SAID**:

> The last non-zero coefficient in the scan is found, and its position is coded and added to the bitstream 320. **Then, the coefficients in the scan are processed (322) in reverse order, from the last non-zero**

> **coefficient in the scan to the first**. [emphasis added by Applicants]

See, for example, col. 3 of **SAID**, lines 8-10. Thus, the portion of **SAID** pointed to in the Office Action for showing Applicants' particularly claimed significance map specifying the **positions** of non-zero transform coefficients in the scan order, does not specify such **positions** at all.

Further, pages 3 - 4 of the Office Action states, in part:

> note ALL COEFFICIENTS IN, ALL SCANS = 0, NO

In other words, the Office Action is referring to step 314 of Fig. 3 of **SAID**. Step 314 is explained in col. 3 of **SAID**, lines 1-6, which state:

> If all coefficients in all scans are equal to zero (314), a special symbol indicating such is added to the bitstream (316), and the coding is finished. **If all coefficients in all scans are not equal to zero (314), a special symbol indicating such is added to the bitstream** (318), and the first scan is examined (326).

Thus, the cited portion of **SAID** merely states that if all coefficients in the scans are non-zero, a special symbol indicating this is added to the bitstream. However, the foregoing portion of **SAID**, pointed to in the Office Action, has **nothing** to do with **the coding of a significance map**

specifying the positions of transform coefficients being unequal to zero, as required by Applicants' claims.

Further, page 4 of the Office Action alleged, in part:

> the context-based coding assigns different code books to different distributions, scan positions...

However, Applicants are unclear as to how this pertains to the claims. The relevant portion of Applicants' claims against which this was cited states:

> ... in a context-dependent way using contexts depending on the corresponding scan position of the transform coefficient considered,

However, **SAID** does **not** teach or suggest anything about **a scan position dependency of the code books to be used.** In fact, the code book assignment suggested in col. 3 of **SAID** is **independent of the scan position**. Rather, in **SAID, the code book assignment merely depends on the value of the transform coefficient preceding the currently coded transform coefficient, in reverse scan order.**

Finally, page 4 of the Office Action refers to step 326 of **SAID**, to allegedly show that the significance map is coded and **then** the transform coefficients being unequal to zero are coded. Applicants respectfully disagree. In accordance with the disclosure of **SAID**, step 326 of **SAID** separates the coding

of completely different portions of the block 210. However, contrary thereto, the word "subsequently" in Applicants' independent claims separates a coding **of a significance map** and a coding **of values of transform coefficients**, wherein it is clear from these independent claims, that the significance map and the values relate o the same transform coefficients of the same block.

Further, page 4 of the office Action acknowledged that **SAID** does not particularly disclose coding or decoding using contexts depending on a number of transform coefficients already coded in the reverse scan order having a magnitude of 1 and a number of transform coefficients already coded in the reverse scan order having a magnitude of greater than 1, as required by claims 24, 33 - 38 and 47. Rather, the Office Action points to the **YIP** reference as allegedly curing this deficiency of **SAID**. Applicants respectfully disagree.

The **YIP** reference, cited in both of item 6 and item 7 of the Office Action, does not cure any of the above-discussed deficiencies of the **SAID** patent.

More particularly, the **YIP** reference pertains to a JPEG 2000 coder. In particular, **YIP** discloses a particular way of

storing the significance information needed within the code block compression procedure of JPEG 2000. Especially, col. 5 of **YIP**, lines 44 - 55, discloses:

> In order to achieve this throughput, the memory store 106 comprises sixteen memory banks each storing a respective portion of the `significance` states of the code block. These sixteen memory banks together constitute the total `significance` states of the code block with no duplication of any data. The memory store 106 simultaneously addresses these sixteen memory banks with the pixel location of the symbol bit to be encoded, which memory banks return the `significance` states of coefficients in a 4x4 neighbourhood surrounding the addressed pixel location including the `significance` state of the addressed pixel location.

However, with the exception of the special way of storing the significance information disclosed in **YIP**, **YIP** merely concerns a JPEG 2000 code block compression procedure.

JPEG 2000 is a sort of coding according to which the transform coefficients of a transform coefficient code block are coded bit-plane by bit-plane (see, for example, col. 1 of **YIP**, lines 38-41 and col. 4 of **YIP**, lines 49-52). Within a respective bit-plane, the bit symbols are coded in a predetermined order (see, for example, col. 4 of **YIP**, lines 52-55). Further, under the JPEG 2000 standard, "the context of a bit symbol of a coefficient, which bit symbol is to be coded by the arithmetic coder 102, is based on the significance date of the eight

surrounding pixel coefficients in the same bit-plane of the code block". See, for example, col. 4 of **YIP**, lines 57-61.

Thus **YIP**, like **SAID**, does **not** teach or suggest, among other limitations of Applicants' claims, in a context-dependent way **using contexts depending on how many transform coefficients having a magnitude of 1 have already been coded in the reverse scan order up to a respective currently coded transform coefficient, and how many transform coefficients having a magnitude of greater than 1 have already been coded in the reverse scan order up to the respective currently coded transform coefficient, respectively**, as currently required by Applicants' claims. Instead, **Yip** merely inspects, according to the JPEG 2000 protocol, the neighbourhood of the currently coded bit symbol in order to determine the context of the currently coded bit symbol **irrespective of how many bit symbols of 1 or 0 have been coded** in the current bit-plane or one of the earlier bit-planes and **irrespective of how many transform coefficients outside this neighbourhood are already significant or not.** Thus, among other limitations of Applicants' claims, **YIP** does not teach or suggest the context coding of Applicants' claims.

Finally, it is noted that the JPEG 2000 protocol of **YIP** concerns a type of block coder that completely differs from

"coding all bins of the binarization of the respective currently to be coded transform coefficient being unequal to zero before proceeding with coding the bins of the binarization of a -in the reverse scan order- succeeding transform coefficient being unequal to 0" as clarified in the Applicants' presently presented independent claims. Thus, even in accordance with the disclosure of the **SAID** reference, the transform coefficients are coded coefficient-by-coefficient, rather than bit-by-bit and then stepping to the next lower bit-plane. Thus, a person skilled in this art reading **SAID** and **YIP** would not receive any teaching, suggestion or motivation to combine those references in the manner suggested in the Office Action. Nor, as discussed above, would such a combination teach or suggest all limitations of Applicants' claims.

The **MITCHELL** reference, cited in item 7 of the Office Action in combination with **YIP**, and the **KARCZEWICZ** reference, cited in combination with **YIP** and **SAID** in item 8 of the Office Action, do not cure the above-discussed deficiencies of the **YIP** and **SAID** references. For the foregoing reasons, among others, Applicants' claims are believed to be patentable over the **SAID**, **YIP**, **MITCHELL** and **KARCZEWICZ** references, whether taken alone or in combination.

It is accordingly believed that none of the references, whether taken alone or in any combination, teach or suggest the features of claims 24, 33 - 38, 47 and 48. Claims 24, 33 - 38, 47 and 48 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claims 24 or 33.

In view of the foregoing, reconsideration and allowance of claims 24 - 44, 47 and 48 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,

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